

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.(currently amended) A method of interfacing for variable length packet and cell transfer between a first layer device and a second layer device comprising:

- (a) dividing control information into an in-band portion and an out-of-band portion, said control information having a plurality of control words;
- (b) transmitting the in-band portion of said control information along a ~~hardwired~~ physical path for data from one of said first and second layer devices to another of said first and second layer devices, wherein said in-band control information controls data bus lanes and not data, wherein said in-band portion is control information as to status and destination address of data being sent and to align parallel data lines that comprise a data path and said out-of-band portion is credit-based FIFO status flow control information, and wherein said interfacing is done independently in both transmit and receive directions and a number of credits granted to each port depends on an encoded state of a corresponding port status;

(c) transmitting the out-of-band portion of said control information along a ~~hard-wired~~ physical path for control/signaling, different than said physical path for data path, from one of said first and second layer devices to another of said first and second layer devices; and

(d) inserting in said data path a control of data signal to identify when the data path contains control information and when it contains data; whereby re-encoding of data and insertion of control information upon pre-determined intervals is avoided.

2. (cancelled) ~~A method according to claim 1, wherein said in-band portion is control information as to status and destination address of data being sent and to align parallel data lines that comprise a data path and said out-of-band portion is credit-based FIFO status flow control information; whereby said interfacing is done independently in both transmit and receive directions and a number of credits granted to each port depends on an encoded state of a corresponding port status.~~

3. (currently amended) A method according to claim 1 2, including using a "1 1" framing pattern on a FIFO status channel to mark boundaries of the framing pattern without requiring an out-of-band framing signal.

4. (previously presented) A method according to claim 1, including sending a training control pattern periodically in order to allow a receive interface to check and correct for de-skew on start-up and during regular operation to compensate for skew variations due to changes in voltage, temperature, noise and other factors.
5. (original) A method according to claim 1, using a clock in a direction opposite to the data path as a reference source for the data path transmitting from a side of the interface opposite to a transmitting end.
6. (previously presented) A method according to claim 4, wherein a transmitting end of the data path sends data and control signals precisely aligned with respect to a source-synchronous clock and the training control pattern once every MAX_T where MAX_T is configurable on start-up.
7. (previously presented) A method according to claim 1, wherein said control information has a plurality of control words and wherein each control word of said control information contains an error-detection code and one or more control words are inserted between bounded transfer periods whereby performance of the code is not degraded by overly long transfers.
- 8.(original) A method according to claim 1, wherein an end-of-packet event and error codes are combined into a two-bit code to reduce the number of bits required.

9. (cancelled)

10.(previously presented) A method according to claim 1, wherein a single control word of said plurality of control words may contain control information that applies to data preceding said single control word as well as data following said single control word.

11. (cancelled)

12. (currently amended) A method according to claim ~~1~~ 44, wherein said first layer device is a physical layer (PHY) device and said second layer devices are a transmit link layer device that transmits data to said PHY device, and a receive link layer device that receives data from said PHY device.

13. (currently amended) A method according to claim 14, wherein said in-band portion includes packet address, delineation and error control coding and said out-of-band portion is FIFO status flow information whereby an interface between said first layer device and said second layer device operates independently in both transmit and receive directions.

14.(currently amended) A de-skewing circuit for de-skewing data arriving on a M data lines, where M is selected from the series 1, 2,K, where K is an integer, comprising:

(a) M serial-in parallel-out (SIPO) blocks, each of said M SIPO blocks coupled to a corresponding one of said M data lines, said M SIPO blocks converting nM -bit words of serial input data from said M data lines to parallel data, where n M is an integer;

(b) M register sets coupled to said M SIPO blocks, each of said M register sets storing most recent $W \times M$ -bit ~~n -bit~~ words of serial input data arriving on each of said plurality of M data lines, ~~where M and W are selected from the series 1, 2, ..., K, where K is an integer;~~

(c) a training detector block coupled to said M register sets ~~of registers~~ and detecting the presence of a training pattern based on the contents of said M register[s] sets;

(d) a plurality of transition detection blocks each coupled to one of said M register sets ~~of registers~~ and searching and detecting a transition in each bit position within each one of said M register sets ~~of W registers~~; and

(e) an aligner block coupled to said plurality of transition detection blocks selecting appropriate bits within each of said M register sets ~~of registers~~ from which to read each bit in order to present a de-skewed output.

15. (currently amended) A de-skewing circuit, comprising:

(a) 17 serial-in parallel-out (SIPO) blocks, ~~each one~~ coupled to a respective ~~corresponding~~ input data lines of a ~~plurality of 17~~ input data lines which transmit serial data to said SIPO blocks and convert serial input data to parallel output data, each of said SIPO blocks having a 17-bit ~~n-bit~~ output[s] ~~where n is an integer equal to a word size of said parallel output data from each of said SIPO blocks~~, each of said SIPO blocks having separate bit outputs for each bit of said 17-bit parallel output data contained therein;

(b) 17 register sets coupled to said 17 SIPO blocks, each of said 17 register sets storing most recent $W \times n$ -bit words of data arriving on each of said 17 input data lines, ~~where W is the number of registers selected from the numbers in series 1,2, ...,K where K is an integer;~~

(c) a training detector block coupled to outputs of said 17 sets of registers which detect the presence of a training pattern based on the contents of said 17 register ~~sets of registers~~;

(d) 17 transition detection blocks each coupled to an output of respective ones ~~outputs of said 17 register sets of registers with each~~ with outputs of said register sets being coupled to of said 17 transition detection blocks, each transition detection block having 17 $n \times W$ inputs ~~where n is the number of bits in each register and W is the number of registers, when~~ and after the presence of the training pattern has been

detected in within said ~~n*W~~ 17 bits of each of said 17 registers by an associated one of said 17 transition detection blocks, ~~one of~~ said 17 transition detection blocks independently searching for a transition on bits within the training pattern detected by said training detector block; and

(e) an aligner block coupled to outputs from said 17 transition detection blocks, and to outputs of said register sets, selects a register from which to read each bit ~~bit~~ from within the ~~n*W~~ 17 bits of each of the 17 register sets to read in order to present a de-skewed output by allowing a receiving end of each interface to correct for relative skew differences of up to +/- 1bit time.